



# Minnesota Pollution Control Agency

520 Lafayette Road North  
St. Paul, MN 55155-4194

# AERA-19b

## Cumulative Air Emissions Risk Analysis Example Air Emissions Risk Analysis (AERA)

Doc Type: Air Emissions Risk Assessment – External Documentation

### Instructions on Page 5

**Purpose:** This form is an example of a completed Cumulative Air Emissions Risk Analysis Form. **Example preparer responses are in red. Example MPCA responses are in green.** The AERA-19 form describes the cumulative analysis in an AERA submitted either prior to submitting an air permit application (pre-app) or with an air permit application (post-app) and the Minnesota Pollution Control Agency (MPCA) review of these materials. Cumulative air emissions risk analyses are intended to provide information about risks from sources of air toxics that may interact with the project in such a way as to cause cumulative impacts. ***MPCA staff will fill out areas in italics during their review, indicating deficiencies and advising the applicant on how they can be remedied.*** Instructions on how to fill out this form are at the end of the form. For background information and guidance on “How to Conduct a Cumulative Air Emission Risk Analysis” visit <http://www.pca.state.mn.us/lupg42d>. An AERA submitted with an air permit application is not considered “substantially complete” until all necessary quantitative and qualitative information has been submitted and MPCA staff have determined the appropriate methods have been used. **Submitting AERA materials for review prior to submitting an air permit application is highly recommended** so that site specific suggestions from MPCA staff can be included in AERA materials submitted with an air permit application.

### Facility Information

1. AQ Facility ID No.: <u>12345678</u>	2. SIC Code: <u>12345</u>
3. Date(s) of pre-application submittal: <u>07/01/2011</u> , <u>08/01/2011</u> (mm/dd/yyyy)	4. Date(s) of permit application submittal: <u>09/01/2011</u> (mm/dd/yyyy)
5. Facility name: <u>Example Facility</u>	
6. Facility location Street address: <u>Example address</u> City: <u>Example city</u> State: <u>MN</u> Zip code: <u>Example zip</u> County: <u>Example county</u>	
7. Proposer: <u>Example Proposer</u>	Phone: <u>123-456-7890</u> E-mail: <u>example.email@example.com</u>
8. AERA Preparer: <u>Example Preparer</u>	Phone: <u>123-456-7890</u> E-mail: <u>example.email@example.com</u>

Are there differences between the cumulative air emission s risk analysis materials submitted pre-app and those submitted post-app? ☒ Yes ☐ No ☐ NA

If yes, please explain the differences:

Submittal was identical to 08/01/2011 submittal except that facility risks changed to reflect more refined facility modeling.

**MPCA review question:** Are there differences between the cumulative air emission s risk analysis materials submitted pre-app and those submitted post-app? ☒ Yes ☐ No ☐ NA

If yes, please explain the differences:

Same as above.

### MPCA Overall Summary of Cumulative Analysis Review

Name(s) of MPCA Reviewer(s): Risk Assessor A (RAA)

Submittal date(s) (mm/dd/yyyy)	Pre-app review date(s) (mm/dd/yyyy)	Overall pre-app AERA cumulative determination (Select Yes for adequate, No for deficient, and enter reviewer's initials)	Post-app completeness review date (mm/dd/yyyy)	Overall post-app AERA cumulative completeness determination and reviewer's initials	**Technical accuracy review date (mm/dd/yyyy)	**Technical accuracy determination and reviewer's initials
<u>07/01/2011</u>	<u>07/03/2011</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Init: <u>RAA</u>		<input type="checkbox"/> Yes <input type="checkbox"/> No Init: _____	<u>07/13/2011</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Init: <u>RAA</u>
<u>08/01/2011</u>	<u>08/03/2011</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Init: <u>RAA</u>		<input type="checkbox"/> Yes <input type="checkbox"/> No Init: _____	<u>08/13/2011</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Init: <u>RAA</u>

**MPCA overall pre-app cumulative review notes including comments on deficiencies and how they can be remedied:**

07/01/2011 missing map of monitors and used rural monitoring data instead of suburban monitoring data. To remedy this please resubmit this AERA form with the missing map of monitors and use suburban monitoring data instead. 7/07/11 E-mailed this form to the facility indicating deficiencies and how to remedy them.

08/01/2011 map of monitors was submitted along with this form using suburban monitoring data.

**MPCA overall post-app cumulative review notes including comments on deficiencies and how they can be remedied:**

09/01/11 submitted AERA-19 form had no deficiencies.

**\*\*MPCA overall cumulative technical accuracy review notes including comments on deficiencies and how they can be remedied:** 07/01/2011 issue noted above. No additional technical deficiencies found.

## Qualitative Cumulative Analysis Information

The proposer/AERA preparer should fill out the first two columns in the following tables. *In the italicized columns, MPCA staff will mark pre-app sections with "Yes" for adequate, "No" for deficient, and enter their initials; and will mark post-app sections with "Yes" for substantially complete, "No" for incomplete, and enter their initials.*

Submitted	Submittal date(s) (mm/dd/yyyy)	Information	Pre-app review date(s) (mm/dd/yyyy)	Pre-app adequacy	Post-app review date(s) (mm/dd/yyyy)	Post-app completeness
<input checked="" type="checkbox"/> Electronic <input checked="" type="checkbox"/> Hard copy	07/01/2011 009 /01/2011	A map with locations and/or coordinates of potential air emission sources within 10 km. Potential maps can be found on the "What's In My Neighborhood" at <a href="http://www.pca.state.mn.us/backyard/neighborhood.html">http://www.pca.state.mn.us/backyard/neighborhood.html</a> and "Environmental Data Access" <a href="http://www.pca.state.mn.us/data/edaAir/index.cfm">http://www.pca.state.mn.us/data/edaAir/index.cfm</a> websites for potential maps.	07/03/2011	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Init: <u>RAA</u>	09/13/2011	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Init: <u>RAA</u>
<input checked="" type="checkbox"/> Electronic <input checked="" type="checkbox"/> Hard copy	07/01/2011 08/01/2011 09/01/2011	A map with locations and/or coordinates of nearby monitoring stations, if proposer is using customized data.	07/03/2011 08/03/2011	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Init: <u>RAA</u> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Init: <u>RAA</u>	09/13/2011	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Init: <u>RAA</u>
<input checked="" type="checkbox"/> Electronic <input checked="" type="checkbox"/> Hard copy	07/01/2011 09/01/2011	A map with locations and/or coordinates or descriptions (e.g. along eastern fence line) of maximum risks.	07/03/2011	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Init: <u>RAA</u>	09/13/2011	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Init: <u>RAA</u>

9. Zip code population density of the most impacted area from the project/modification (can be found at

<http://www.city-data.com/> 555

10. What type of ambient monitoring data will be/was used?

☐ MPCA generated low population density data (see item 14) ☒ MPCA generated intermediate population density data (see item 14) ☐ Customized

11. If data will be/was customized, briefly explain how and why?

12. Please indicate all of the off-site sources this data set is being used to reflect:

☒ Mobile ☒ Area ☒ Point ☒ Background sources

13. What off-site sources were modeled?

For each off-site point source within 10 kilometers, briefly (one page or less) discuss why it was or was not modeled. In addition, for off-site point sources of potential concern which are not modeled but emit pollutants not reflected in the monitoring data set (see "How to Conduct a Cumulative Air Emissions Risk Analysis"), include any available information about distance to the potentially most impacted area, emissions profile, process and fuel type, historical regulatory compliance, public complaints, dispersion characteristics (stack height, prevailing wind direction), etc.

The following facilities are within 10km of the proposed project but were not modeled. These facilities have registration permits or no specific air toxics data and, due to their level of emissions and distance from the area of maximum impact from the proposed project, are not expected to contribute beyond what would be captured with representative ambient air monitoring data.

Facility A

Facility B

Facility C.

Facility D has a Title V Permit and is approximately 8km from the area of maximum impact of the proposed project. MPCA has emissions data from a toxic release inventory but the facility has not been modeled previously. An analysis of the possible health effects from Facility D at the area of maximum impact for the proposed project may be necessary, depending on their emissions and dispersion characteristics. The MPCA is gathering more information about their emissions, regulatory compliance, public complaints and dispersion characteristics in order to determine how to characterize the potential cumulative impacts from this facility.

Facility E has a Title V Permit, is 1 km from the area of maximum impact for the proposed project and was modeled in 2000 as part of an AERA. As indicated by a dispersion factor of zero at a distance of 1km using the look up dispersion factors in the RASS sheet, no contribution is expected at the area of maximum impact beyond what would be captured with representative monitoring data.

Facility F has a Title V Permit, is 0.5 km from the area of maximum impact from the proposed project and was modeled for a PSD permit in 2000. The risks from Facility F were modeled and are summarized in section 15 of this sheet.

### MPCA qualitative cumulative information review summary

Submittal date(s) (mm/dd/yyyy)	Pre-app review date(s) (mm/dd/yyyy)	Pre-app adequacy	Post-app completeness review date(s) (mm/dd/yyyy)	Post-app completeness	Technical accuracy review date(s) (mm/dd/yyyy)	Technical accuracy
07/01/2011	07/03/2011	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Init: <u>RAA</u>		<input type="checkbox"/> Yes <input type="checkbox"/> No Init: _____	07/13/2011	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Init: <u>RAA</u>
08/03/2011	08/03/2011	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Init: <u>RAA</u>		<input type="checkbox"/> Yes <input type="checkbox"/> No Init: _____	08/13/2011	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Init: <u>RAA</u>
09/01/2011		<input type="checkbox"/> Yes <input type="checkbox"/> No Init: _____		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Init: <u>RAA</u>	09/13/2011	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Init: <u>RAA</u>

### MPCA qualitative cumulative review questions:

Is all the required information present? ☒ Yes ☐ No

Was MNRisk used to confirm the information? ☒ Yes ☐ No If yes, use the MPCA internal nearby sources review form.

### MPCA qualitative cumulative review notes:

See summary notes.

## Quantitative Results

### Summary table of cumulative quantitative risk results

	Inhalation cancer risk	Inhalation chronic non-cancer hazard index *	Inhalation acute hazard index *
Ambient monitoring data	2 in 100,000	0.4	0.2
Modeled off-site sources (separated by source)	1 in 1,000,000	0.1	0.3
Total proposed facility (from AERA)	1 in 1,000,000	0.5	0.5
Total cumulative sum	4 in 1,000,000	1.0	1.0
Change in risk from proposal	0.4 in 1,000,000	0.1	0.1
% contribution from proposal of total cumulative sum	10%	10%	10%

\*If hazard indices are above one, separate by health endpoints.

14. The following risk estimates from ambient monitoring data may be used in typical assessments. Within the population density category, risks are separated by health end point, pollutant families and risk driver pollutants.

## Zip code population densities of less than 500 people per square mile

### Risks by target health endpoints

	Respiratory	Nervous system	Eyes	Reproductive	Developmental	Hematopoietic
<b>Chronic</b>	0.41		0.32			
<b>Acute</b>	0.22		0.1			

### Risks by pollutant families

Pollutant Group Name	Cancer risk in 100,000	Chronic non-cancer	Acute non-cancer
Metals	0.05	0.1	
VOCs	1.43	0.06	0.01
Carbonyls	0.66	0.41	0.1
NO <sub>2</sub>			0.12
Sum	2.14	0.57	0.24

### Risk driver pollutant risks

Pollutant	Cancer risk in 100,000	Chronic non-cancer	Acute non-cancer
Carbon tetrachloride	0.83		
Ethylene chloride	0.10		
Benzene	0.40		
Formaldehyde	0.48	0.32	0.1
Acetaldehyde	0.18	0.09	
NO <sub>2</sub>			0.12
Sum of risk drivers	1.99	0.41	0.22

## Zip code population densities between 500 and 2,999 people per square mile

### Risks by target health endpoints

	Respiratory	Nervous system	Eyes	Reproductive	Developmental	Hematopoietic
<b>Chronic</b>	0.81	0.13	0.70			
<b>Acute</b>	0.57		0.30	0.11	0.11	

### Risks by pollutant families

Pollutant group name	Cancer risk in 100,000	Chronic non-cancer	Acute non-cancer
Metals	0.94	0.27	0.19
VOCs	2.13	0.15	0.04
Carbonyls	1.27	0.81	0.3
NO <sub>2</sub> (Respiratory)			0.19
Sum	4.34	1.24	0.72

VOCs = Volatile Organic Compounds (VOCs)

Nitrogen Dioxide (NO<sub>2</sub>)

### Risk driver pollutant risks

Pollutant	Cancer risk in 100,000	Chronic non-cancer	Acute non-cancer
Arsenic	0.55		0.11
Manganese		0.13	
Beryllium	0.13		
Chromium	0.14		
Carbon Tetrachloride	0.83		
Benzene	0.55		
Butadiene, 1,3-	0.24		

Pollutant	Cancer risk in 100,000	Chronic non-cancer	Acute non-cancer
Methyl Chloride	0.19		
Ethylene Chloride	0.13		
Tetrachloroethene	0.10		
Formaldehyde	1.10	0.7	0.3
Acetaldehyde	0.23	0.11	
NO <sub>2</sub>			0.19
Sum of risk drivers	4.19	0.94	0.60

#### MPCA quantitative cumulative review summary

Submittal date(s) (mm/dd/yyyy)	Pre-app review date(s) (mm/dd/yyyy)	Pre-app adequacy	Post-app completeness review date(s) (mm/dd/yyyy)	Post-app completeness	Technical accuracy review date(s) (mm/dd/yyyy)	Technical accuracy
07/01/2011	07/03/2011	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Init: <u>RAA</u>		<input type="checkbox"/> Yes <input type="checkbox"/> No Init: _____		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Init: <u>RAA</u>
08/03/2011	08/03/2011	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Init: <u>RAA</u>		<input type="checkbox"/> Yes <input type="checkbox"/> No Init: _____		<input type="checkbox"/> Yes <input type="checkbox"/> No Init: _____
09/01/2011		<input type="checkbox"/> Yes <input type="checkbox"/> No Init: _____		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Init: <u>RAA</u>	09/13/2011	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Init: <u>RAA</u>

#### MPCA quantitative cumulative review questions:

Is all the required information present? ☒ Yes ☐ No

Are the assumptions presented in this section appropriate? ☒ Yes ☐ No

**Quantitative cumulative review notes:** See summary notes.

#### 15. Briefly (one page or less) discuss uncertainties specific to the cumulative analysis for this project.

**This proposed modification is part of an overall emissions reduction effort resulting from a public initiative to reduce air toxics in the area. The health risks from the proposed modification are "X" percent of the potential cumulative inhalation cancer risks.**

### Proposer/Preparer Instructions

Boxes can be checked by clicking on them. Response areas will expand as necessary to include the complete response. Multiple dates can be added by using the "Enter key" (return key) after you type the first date. All Air Emission Risk Analysis (AERA) documents must be submitted electronically whether submitted with an air permit application or alone. AERA documents submitted with an air permit application must also be submitted in a hard copy. Hard copies of spreadsheets, like the Risk Assessment Screening Spreadsheet (RASS) and lengthy modeling files should include the first summary page of the document but do not need to include subsequent pages since the electronic version will be available for review.

If **all** of the requested forms and support documents **are not included** with an air permit application needing an AERA the air permit application **will be deemed incomplete**. This includes risk estimates for pre-existing facilities. MPCA staff will return this AERA form plus any other incomplete AERA forms to the applicant with deficiencies and remedies indicated in the italicized MPCA review areas. If forms were submitted pre-app they should be updated and re-submitted post-app with any italicized MPCA comments left in and changes summarized in the appropriate areas.

**Facility Information:** Fill in the Air Quality (AQ) Facility identification (ID) No. (Number), which is the first eight digits of the permit number for all new permits issued under the new operating permit program, Standard Industrial Classification (SIC) code, facility name and location, and submittal dates. The project proposer and AERA preparer should be people that MPCA staff can contact with general and technical questions about the AERA submittal.

### MPCA Review Instructions

#### Specific section/document review

MPCA staff will summarize their review of specific sections/support documents by marking either "Yes" for adequate or "No" for deficient in the pre-app sections, or "Yes" for substantially complete or "No" for incomplete in the post-app sections, along with their initials. They will add comments on deficiencies and how they can be remedied in the summary section. When there are multiple submittals, include each new submittal date in the table with the corresponding review dates and comments, thus keeping a log of submittals.

**Overall adequacy/completeness summary**

If **all** of the necessary sections/documents are present and follow the appropriate methods (i.e., follows the AERA, emissions and modeling guidance) MPCA staff will mark the appropriate overall summary section with either “Yes” for adequate in the pre-app section, or “Yes” for substantially complete in the post-app section. Otherwise they will mark “No” for deficient in the pre-app AERA submittal determination section or “No” for incomplete in the post-app AERA determination section. They will add comments on deficiencies and how they can be remedied in the overall summary section. Remember an AERA submitted with an air permit application is not considered “substantially complete” until **all** necessary quantitative and qualitative information has been submitted, and MPCA staff have determined that appropriate methods have been used. **Please summarize these results in the AERA-01 form.** The AERA-01 form will be shared with the permit engineer conducting the permit application completeness review. If deficiencies are noted in this form during the completeness review then this form should also be shared with the permit engineer who will share it with the applicant.

SAMPLE